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(54) WEAR BAR FOR A SNOWMOBILE SKI

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A B S T R A C T

A wear bar for a snowmobile ski comprises two opposing steel sides which are downwardly depending and which meet to form an integral joint longitudinally of said wear bar. The joint has at least one longitudinal edge for contacting the ground surface which supports the ski. The wear bar may be case-hardened so that each edge consists of hardened steel. In a depression defined between the sides, fastening means are located to facilitate fastening of the wear bar to the ski where the longitudinal edge is parallel to the longitudinal axis of the ski. A wear bar of this structure provides the snowmobiler with improved steering control at a reasonable cost.

Field of Invention

This invention relates to improvements in a snowmobile ski assembly and, more particularly, to wear bars for a snowmobile ski.

Background of the Invention

Snowmobile skis having a runner portion usually have a wear bar secured to the underside thereof which serves to reduce wear by separating the runner portion from hard abrasive surfaces, such as sand-covered ice. This type of wear bar is usually formed from a cylindrical bar of cold rolled steel and it is expected to last for only one season of snowmobiling because of its inherent inability to resist abrasion.

A second drawback with this common type of wear bar is the lack of steering control due to the rounded portion of the wear bar which contacts the surface supporting the snowmobile ski, permitting the wear bar to slide easily over the supporting surface. This is frustrating for the snowmobile operator and can be very hazardous when travelling in congested areas such as at snowmobiling events and races.

Another type of wear bar which is available on the market and usable on most snowmobiles is a bar having several "Carboloy" (trade mark) metal pieces secured to the underside of the bar to present a hard metal edge parallel to the longitudinal axis of the ski where the edge bites into compacted snow, ice and the like, to effect good steering control. However, the disadvantage of this arrangement is that the method of assembly and material costs are quite high so that the replacement or initial purchase cost of the unit discourages one from using this type of wear bar.

The snowmobile ski assembly according to this invention

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has been designed to overcome the above-noted problems by providing a wear bar which effects good steering control and can be manufactured at very low cost so that the snowmobile enthusiast may enjoy the benefits of good steering control at a reasonable cost. The wear bar comprises two opposing steel sides which are downwardly depending and meet to form an integral joint longitudinally of the wear bar. The joint is so formed to present at least one longitudinal edge for contacting the ground surface which supports the snowmobile ski. The wear bar is cold worked to the desired shape or contour to fit snugly to the underside of the particular snowmobile ski. Depending upon the degree of use, the wear bar may be case-hardened so that each edge consists of hardened steel. To facilitate securing of the wear bar to the snowmobile ski, fastening means is positioned in a depression defined between the opposing sides of the wear bar. The wear bar is secured to the snowmobile ski in a manner which ensures that the longitudinal axis of each edge is parallel to the longitudinal axis of the snowmobile ski.

The wear bar may be fabricated from common angle iron where the two opposing steel sides meet at substantially right angles and a V-shaped valley is defined therebetween, the integral joint presenting only one edge. In the instance where the angle iron is case-hardened, it is formed prior to hardening to the contour of the underside of the snowmobile ski to provide a hardened steel portion along the length of the edge.

The configuration and location of fastening means of the wear bar may vary from one type of snowmobile to another, however, such variations may be easily accommodated by cold working the steel material to the desired shape for making the wear bar according to this invention. For example, with

a snowmobile ski having three spaced-apart apertures formed in the runner portion and aligned with the longitudinal axis of the ski, both end portions of the wear bar may be curved upwardly to extend above a plane defined by the upper surfaces of the two sides of the wear bar, the curved end portions being tapered so as to fit in the two furthermost spaced-apart apertures. The fastening means is located in the depression and is aligned with the central aperture in the runner to permit securing of the wear bar to the snowmobile ski by means of a bolt and/or nut.

Summary of the Invention

It is an object of the invention to provide a wear bar for a snowmobile ski which provides good steering control while operating the snowmobile.

It is a further object of the invention to provide a wear bar which may be easily adapted during fabrication to fit any make of snowmobile ski.

It is another object of the invention to provide a wear bar which may be manufactured at low cost and effect good steering control.

It is yet another object of the invention to provide a wear bar which may be easily attached in the field to a snowmobile ski.

It is a further object of the invention to provide a wear bar which may be manufactured from one type of stock steel material, and subsequently, case-hardened to provide a durable supporting edge on the wear bar for the snowmobile ski.

Brief Description of the Drawings

These and other objects, features and advantages of the invention are discussed in more detail hereinafter in association with the accompanying drawings in which:

Figure 1 is an exploded view of a snowmobile ski assembly according to a preferred embodiment of this invention;

Figure 2 is a cross-sectional view of a portion of a snowmobile ski having a wear bar according to this invention secured to the underside thereof;

Figure 3 is a cross-section along the lines 3-3 of the snowmobile ski assembly of Figure 2; and

Figure 4 is a perspective view of a wear bar according to this invention having an alternative fastening means arrangement.

Detailed Description of the Preferred Embodiments

A snowmobile ski assembly 10 is shown in Figure 1 having a snowmobile ski 12, a runner portion 14 and an upturned portion 16 at the forward end of the ski where a handgrasp 18 is provided at the forward portion of the ski to permit handling of the snowmobile. By way of a standard spring apparatus, the snowmobile is connected to the ski by brackets 20 and 22. Three apertures 24, 26 and 28 are located in the runner portion 14 and are aligned parallel to the longitudinal axis of the ski 12.

A wear bar 30 which is adapted to be secured to the underside of the snowmobile ski is formed from angle iron and comprises two opposing sides 32 and 34 which meet at substantially right angles to define a depression 36 therebetween. End portions 38 and 40 of the ski are curved upwardly and are tapered as shown. End portions 38 and 40 have tapered tips 42 and 44 respectively, both of which extend above a plane defined by the upper surfaces of sides 32 and 34. Tips 42 and 44 are received by apertures 28 and 24 respectively and fastening means 46 which is a metal plate having a threaded hole is aligned with the central axis of aperture 26. Upon insertion of tips 42 and 44 in the respective

apertures, a bolt 48 and lock washer 50 are used to secure the wear bar 30 to the ski 12 by co-operating with fastening means 46. Once bolt 48 is securely tightened, longitudinal and lateral movement of the wear bar 30 with respect to the ski 12 is precluded where tips 42 and 44 serve to align the longitudinal axis of the wear bar with the longitudinal axis of the ski so that the axes are parallel to one another. Tip 42 may also function to preclude relative longitudinal movement of the wear bar with respect to the snowmobile ski.

In Figure 2, wear bar 30 is shown as secured to snowmobile ski 12 by bolt 48 being threaded into fastening means 46. In assembling the wear bar, tip 44 is placed in aperture 24 first and is inserted far enough into aperture 24 to permit tip 42 to pass through aperture 28. Bolt 48 is threaded into the threaded hole of fastening means 46 which is aligned with aperture 26 to secure wear bar 30 to the underside of ski 12.

In forming the wear bar 30, the upper surfaces of sides 32 and 34 of a straight standard piece of angle iron are machined in a downwardly direction so that each end is tapered to a point. The ends of the machined bar are then bent to form curved end portions 40 and 38. The tips 42 and 44 of the bar are then formed by bending them the additional amount required to conform to the particular ski design. Fastening means 46 is positioned in the V-shaped valley defined between sides 32 and 34 so that when tips 42 and 44 are placed in the respective apertures, the threaded hole of the fastening means is aligned with aperture 26.

The fastening means 46 consists of a metal plate 52 as is more clearly shown in Figure 3. The plate has a threaded hole 54 of thread corresponding with the thread of bolt 48. The

metal plate 52 is secured in the V-shaped valley by weld beads 56.

Sides 32 and 34 of the wear bar are downwardly depending from their upper surfaces 58 and 60 which contact the underside of runner portions 14 of the snowmobile ski. The downwardly depending sides meet to form an integral joint 62 which is longitudinal of the wear bar, where the sides meet at substantially right angles. As mentioned hereinbefore, sides 32 and 34 may meet to form an integral joint having more than one edge. In the preferred embodiment shown in Figure 3, the joint has a single edge 64 which extends the full length of the wear bar.

Subsequent to the process of forming the wear bar to fit a particular snowmobile ski, the wear bar may be optionally case-hardened to provide hardened steel all the way along edge 64. Depending upon the severity of use of the wear bar, it need not necessarily be case-hardened in that the soft metal can withstand some abrasion. However, when it is desired to make a long-lasting wear bar which is subjected to a great degree of abrasion, the wear bar may be case-hardened. Due to the shape of the angle iron of wear bar 30, case-hardening of the portion of the angle iron which constitutes the longitudinal joint 62 results in the joint consisting substantially of hardened steel due to exposure on both sides of the joint to the case-hardening process. In using angle iron having approximately one-inch wide sides of 1/8 inch thickness, the case-hardening of the angle iron provides sufficient hardened steel along edge 64 to permit extensive wear before soft metal of sides 32 and 34 inside the case-hardened metal is exposed to abrasive ground material. However, before edge 64 is worn down to the extent to expose the softer metal, the wear bar would in all likelihood be replaced because steering control of the snowmobile would be reduced due

to edge 64 having a certain degree of roundness caused by wear.

Wear bar 30 may be case-hardened according to accepted manufacturing practices where the case-hardening is carried out to the extent to ensure that edge 64 consists of hardened steel. End portions 38 and 40 of the wear bar are formed and machined to conform to the contour of the underside of runner portion 14, particularly at the front portion 38, to preclude snagging of weeds and branches on the underside of the ski during travel over rough terrain and in bush country. Although not necessary, it is advantageous to have edge 64 extend upwardly along curved portion 38 so that edge 64 is gently leading into the supporting surface thereby permitting the edge to obtain a good bite in the supporting surface. Good steering control is therefore realized by edge 64 preventing side-slipping of the snowmobile skis during turning of the vehicle.

The wear bar 30 may be adapted to fit any type of snowmobile ski during its formation from the stock steel material where the curvature of the upper surface of the wear bar, the number of apertures and the type of fastening means used in attaching the wear bar, may vary. The wear bar shown in Figure 4 illustrates an adaptation of the wear bar 30 wherein two fastening means 66 and 68 are provided, each having a threaded hole formed therein. Tips 42 and 44 remain unchanged, the wear bar 30 being adapted to fit on a snowmobile ski wherein two apertures are provided for bolts to pass therethrough to distribute more evenly the reactive forces and to resist forces exerted on the wear bar which tend to move the wear bar longitudinally and laterally of the ski. Variations in the length of the wear bar and the curvatures of the end portions 38 and 40 are also easily accommodated in forming the wear bar from the angle iron

stock material. Other shapes of stock material may be used in forming the wear bar such as iron formed in the shape of a "W", or channel iron having one or more edges projecting from the underside thereof.

While various embodiments of the invention have been described and illustrated herein, it is understood that variations may be made thereto as will be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A wear bar for a snowmobile ski comprising two opposing steel sides which are downwardly depending and which meet to form an integral joint longitudinally of said wear bar, said joint having at least one longitudinal edge for contacting a ground surface which supports said snowmobile ski; said wear bar being adapted to correspond with the contour of the underside of said snowmobile ski where fastening means for securing said wear bar to the underside of said snowmobile ski is positioned in a depression defined between said opposing sides, the longitudinal axis of each said edge being parallel to the longitudinal axis of said snowmobile ski.

2. A wear bar of claim 1 which has been case-hardened whereby each said edge consists of hardened steel.

3. A wear bar of claim 1 wherein said opposing sides meet at substantially right angles, the shape of said valley being "vee"-shaped, where said integral joint has one edge.

4. A wear bar of claim 3 wherein each end portion of said wear bar is curved upwardly, the portion of said wear bar between said curved end portions being substantially planar, said edge extending at least along said substantially planar portion of said wear bar; said end portions being tapered and extending at least above a plane defined by the upper surfaces of said sides.

5. A wear bar of claim 3 wherein at least one metal plate having a threaded hole formed therein is secured in said "vee"-shaped valley below a plane defined by the upper surfaces of said sides; said metal plates being spaced apart along the length of said valley when there is more than one plate.

6. In a snowmobile ski assembly having a runner portion and a wear bar adapted to be secured to the underside of said runner portion; the improvement comprising said wear bar having two opposing steel sides which are downwardly depending and which meet to form an integral joint longitudinally of said wear bar, said integral joint having at least one longitudinal edge for contacting a ground surface which supports said snowmobile ski; said wear bar being case-hardened whereby each said edge consists of hardened steel; said opposing sides defining a depression therebetween wherein fastening means is provided for securing said wear bar to said runner portion, the longitudinal axis of each said edge being parallel to the longitudinal axis of said snowmobile ski.

7. In a snowmobile ski assembly of claim 6 wherein said wear bar is case-hardened, each said edge thereby consisting of hardened steel.

8. In a snowmobile ski assembly of claim 6, said opposing sides of said wear bar meeting at right angles, the shape of said valley being "vee"-shaped, where said integral joint has one edge.

9. In a snowmobile ski assembly of claim 7, said runner portion having a plurality of spaced-apart apertures formed therein; each end portion of said wear bar being curved upwardly and extending above a plane defined by the upper surfaces of said sides, said end portions being tapered and adapted to be received by two of said apertures; and means for co-operating with said fastening means to secure said wear bar to said runner portion.

10. In a snowmobile ski assembly of claim 7, at least one metal plate having a threaded hole being secured in said "vee"-shaped valley below a plane defined by the upper surfaces of said sides; said runner portion having a plurality of spaced-apart apertures, each said threaded hole being aligned with the respective aperture to permit securing of said wear bar to said runner portion by means of a threaded bolt.

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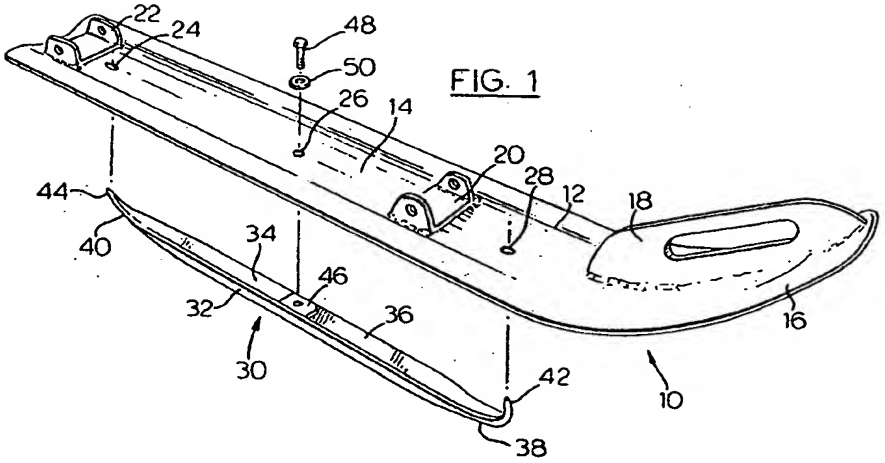

FIG. 1

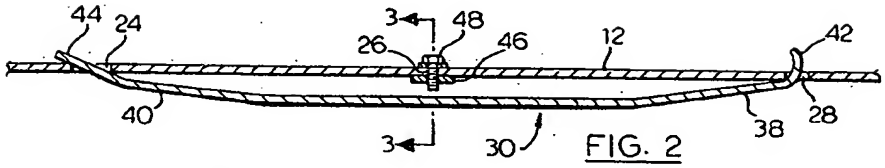

FIG. 2

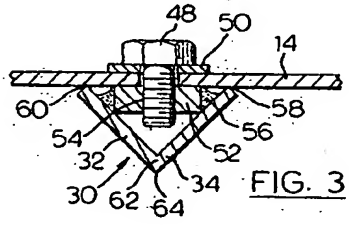

FIG. 3

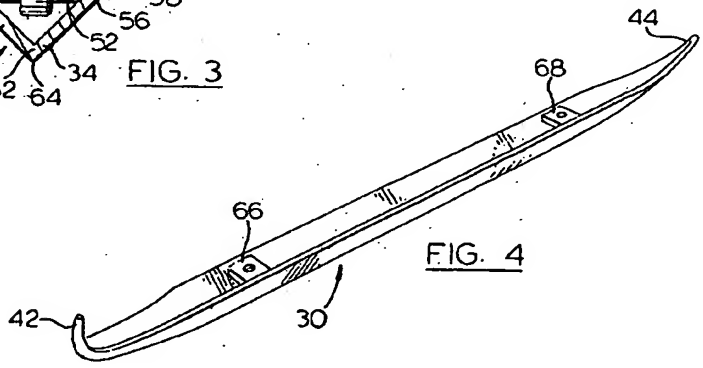

FIG. 4

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